

**REMARKS**

Claims 12-14 and 16-29 are pending in the present application. Claims 12-14 and 16-19 have been amended. Claims 20-29 have been presented herewith. Claims 1-11 and 15 have been canceled. Applicant reserves the right to file a divisional application including non-elected claims 1-8.

**Priority Under 35 U.S.C. 119**

Applicant notes the Examiner's acknowledgment of the Claim for Priority under 35 U.S.C. 119, and receipt of the certified copy of the priority document.

**Drawings**

Enclosed are two (2) red-inked Annotated Marked-up Drawing Sheets. In Fig. 7B, electrode 61 described on page 17, lines 2-4 of the application is properly denoted. In Fig. 9D, electrode 86 described on page 21, lines 6-7 of the application is properly denoted. Also enclosed are two (2) Drawing Replacement Sheets incorporating the above noted drawing corrections. **The Examiner is respectfully requested to acknowledge receipt and acceptance of the Drawing Replacement Sheets.**

**Claim Rejections-35 U.S.C. 102**

Claims 9, 12, 14 and 18 have been rejected under 35 U.S.C. 102(e) as being

anticipated by the Mannou et al. reference (U.S. Patent No. 6,590,918). This rejection, insofar as it may pertain to the presently pending claims, is traversed for the following reasons.

The method of manufacturing a waveguide type optical element of claim 20 includes in combination “forming an undoped compound semiconductor layer on the light absorption layer, wherein the undoped compound semiconductor layer includes a first area, second areas located at both sides of the first area, third areas next to the second areas and fourth areas next to the third areas”; “removing the undoped compound semiconductor layer in the first area to expose a part of the light absorption layer”; “forming a clad layer on the exposed light absorption layer, and on the undoped compound semiconductor layer in the second, third and fourth areas”; and “removing the clad layer located on the undoped compound semiconductor layer in the third areas, and the undoped compound semiconductor layer in the third areas...”.

Although not necessarily limited thereto, the first area of the undoped compound semiconductor layer of claim 20 may be interpreted as corresponding to the centermost portion of undoped InP layer 13 in Fig. 2B of the present application that has been removed, whereby InP clad layer 15 is subsequently formed to extend through this removed portion (first area) to an upper surface of light absorption layer 12. The second areas of the undoped compound semiconductor layer of claim 20 may be interpreted as the portions of undoped InP layer 13 in Fig. 2B covered by clad layer 15 at ridge part 18 of inverse mesa shape. The third areas of the undoped compound

semiconductor layer of claim 20 may be interpreted as corresponding to the portions of undoped InP layer 13 in Fig. 2B that have been removed, whereby polyimide insulation layer 19 is subsequently formed to extend through these removed portions (third areas) to an upper surface of light absorption layer 12. Also, the fourth areas of the undoped compound semiconductor layer of claim 20 may be interpreted as the remaining portions of undoped InP layer 13 in Fig. 2B, which extend from polyimide insulation layer 19 to the respective vertical edges of the cleaved semiconductor device.

The Examiner has interpreted the process as described in connection with Fig. 1A of the Mannou et al. reference as meeting the features of previously pending claim 9. However, the structure in Fig. 1A of the Mannou et al. reference is not described as including an undoped compound semiconductor layer including a first area, and corresponding second through fourth areas, as featured in claim 20. The Mannou et al. reference therefore does not disclose forming an undoped compound semiconductor layer including the above noted first through fourth areas; removing an undoped compound semiconductor layer in a corresponding first area to expose a part of a light absorption layer; and removing a clad layer located on an undoped compound semiconductor layer in corresponding third areas, as well as the undoped compound semiconductor layer in the corresponding third areas, as featured in claim 20.

Since the Mannou et al. reference does not meet the above noted features of claim 20, a thin depletion layer is not formed so that a strong electric field can be applied, whereby an extinction ratio characteristic of the corresponding device is

improved, as in the present invention. Applicant therefore respectfully submits that the method of manufacturing a waveguide type optical element of claim 20 distinguishes over the Mannou et al. reference as relied upon by the Examiner, and that this rejection, insofar as it may pertain to claims 12, 14, 18 and 20, is improper for at least these reasons.

**Claim Rejections-35 U.S.C. 103**

Claims 10, 11, 15 and 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Mannou et al. reference in view of the Kunisato et al. reference (U.S. Patent No. 5,990,496). Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Mannou et al. reference in view of the Fujimoto et al. reference (U.S. Patent No. 6,242,761). Claim 13 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Mannou et al. reference and the Kunisato et al. reference, in further view of the Yamamoto et al. reference (U.S. Patent No. 5,729,030). Also, claim 19 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Mannou et al. reference in view of the Takahashi reference (U.S. Patent No. 6,541,297). Applicant respectfully submits that the secondary references as relied upon by the Examiner do not overcome the above noted deficiencies of the Mannou et al. reference. Accordingly, these respective rejections, insofar as they may pertain to the presently pending claims, are improper for at least these reasons.

### **Claims 21-29**

Applicant respectfully submits that claims 21-24, as ultimately dependent upon claim 20, distinguish over and would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, for at least the above reasons.

Regarding claim 25, the Mannou et al. reference does not appear to disclose in combination forming a window in an undoped compound semiconductor layer to expose a light absorption layer; diffusing an impurity from a clad layer through the window into a light absorption layer beneath the window; and selectively removing the clad layer so that an inverted mesa shaped ridge portion remains above the window. It is not clear how the structure and/or process in connection with Fig. 1A of the Mannou et al. reference can be interpreted as including window and impurity features as noted above in claim 25. Accordingly, Applicant respectfully submits that claims 25-29 distinguish over and would not have been obvious in view of the prior art as relied upon by the Examiner.

### **Conclusion**

The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections, and to pass the claims of the present application to issue, for at least the above reasons.

In the event that there are any outstanding matters remaining in the present application, please contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (703) 715-0870

in the Washington, D.C. area, to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment for any additional fees that may be required, or credit any overpayment, to Deposit Account No. 50-0238.

Respectfully submitted,

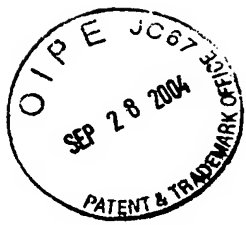
VOLENTINE FRANCOS & WHITT, P.L.L.C.

A handwritten signature in black ink, appearing to read "Andrew J. Telesz, Jr.", with a stylized flourish at the end.

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Enclosures: Two (2) red-inked Annotated Marked-Up Drawing Sheets  
Two (2) Drawing Replacement Sheets



ANNOTATED MARKED-UP DRAWING

12/20

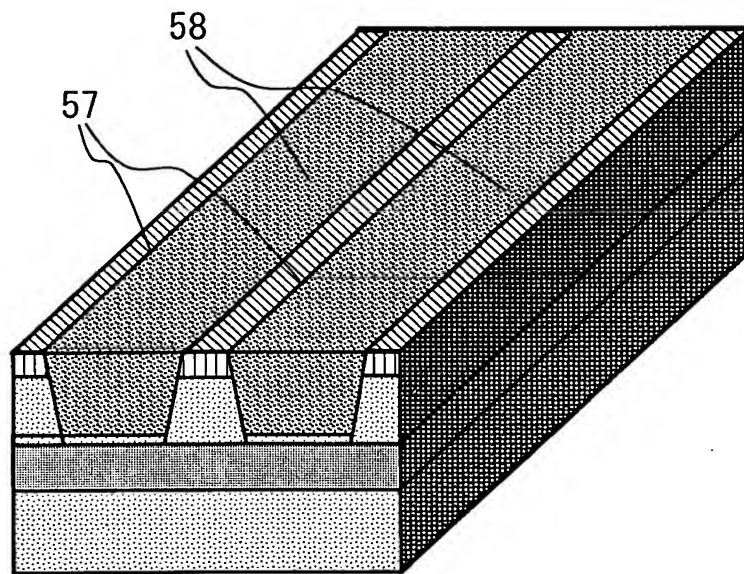


FIG. 7A

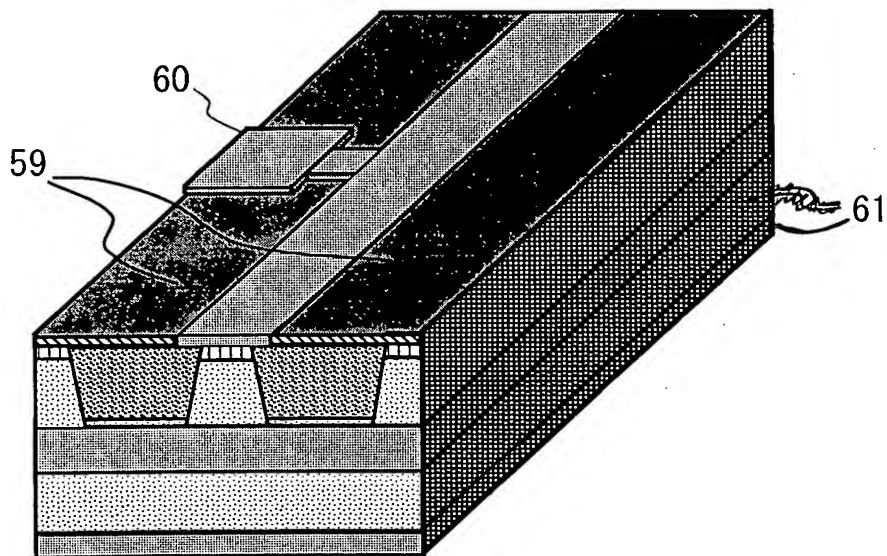
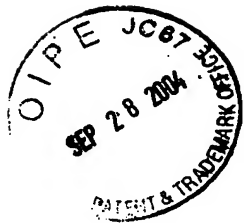


FIG. 7B



ANNOTATED MARKED-UP DRAWING

17/20

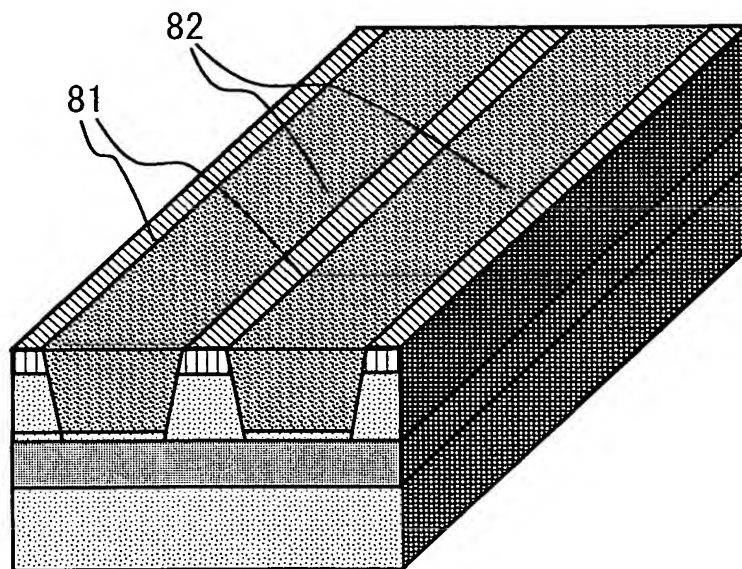


FIG. 9C

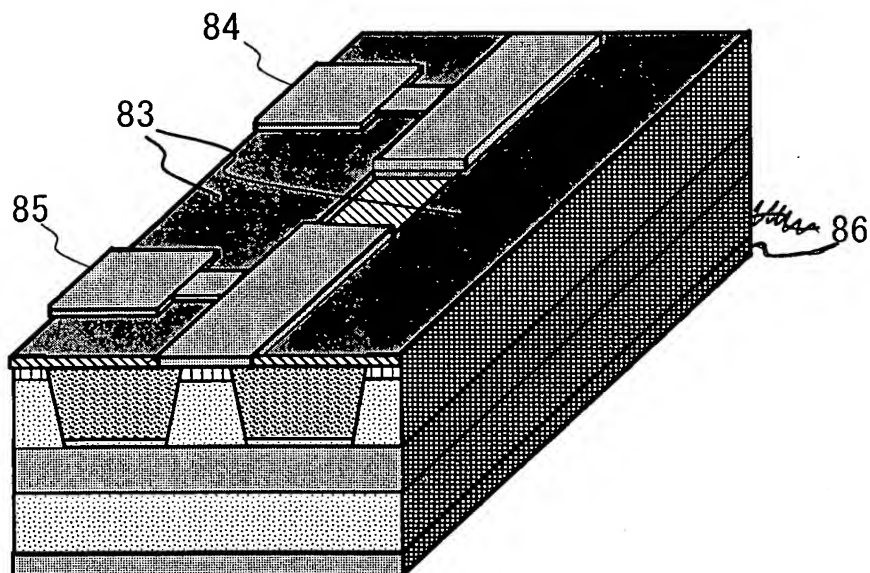


FIG. 9D